20. Write a note on:
    (a) Schottky defects
    (b) Frenkel defects

NOVEMBER/DECEMBER 2023

23PCH12 — STRUCTURE AND BONDING IN INORGANIC COMPOUNDS

Time : Three hours Maximum : 75 marks

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SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What are isopoly acids? Give an example.

2. What is Wade's rule? Give its significance.

3. What do you mean by Madelung constant?

4. Define diffuse radiation.

5. What is the sol-gel method of crystal growth?

6. Draw a Pervoskite structure.

7. What is phase purity in crystal structure?

8. Differentiate between optical and electron microscopy.

9. What is meant by linear defects?

10. What is band theory of solids?

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Describe the effect of lone pair and electronegativity of atoms on the geometry of the molecules.

Or

(b) What are silicates? Explain the types of silicates with its structure.

12. (a) Define bravais lattices. Sketch out its seven lattice systems.

Or

(b) Write note on symmetry operations in crystals.

13. (a) Explain in detail about the hydrothermal synthesis of crystalline solid materials.

Or

(b) Discuss the crystal structure of Wurtzite.

14. (a) What is bragg's law? Explain its significance.

Or

(b) Explain the principle and instrumentation of TEM analysis.

15. (a) What is intrinsic and extrinsic semiconductor? Why extrinsic semiconductor is preferred over intrinsic semiconductors.

Or

(b) Write a note on metal excess and deficient defects.

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SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the structure and bonding features of borane clusters in detail.

17. (a) Describe the packing of ions in simple, hexagonal and cubic close crystal systems.

(b) Derive Born-Lande equation. Explain its importance.

18. (a) Discuss the structural features of rutile and anatase crystal systems.

(b) Sketch out and explain the crystal structures of normal and inverse spinels.

19. (a) Describe the principle and instrumentation of SEM analysis.

(b) With neat sketch discuss the principle and instrumentation of Powder-XRD